Complete Summary

GUIDELINE TITLE

Renal cell carcinoma staging.

BIBLIOGRAPHIC SOURCE(S)

Curry NC, Francis IR, Baumgarten DA, Bluth EI, Bush WH Jr, Casalino DD, Israel GM, Jafri SZ, Kawashima A, Papanicolaou N, Remer EM, Sandler CM, Spring DB, Fulgham P, Expert Panel on Urologic Imaging. Renal cell carcinoma staging. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 8 p. [48 references]

GUIDELINE STATUS

This is the current release of the guideline.

It updates a previous published version: Choyke PL, Bluth EI, Bush WH Jr, Casalino DD, Francis IR, Jafri SZ, Kawashima A, Kronthal A, Older RA, Papanicolaou N, Ramchandani P, Rosenfield AT, Sandler CM, Segal AJ, Tempany C, Resnick MI, Expert Panel on Urologic Imaging. Renal cell carcinoma staging. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 5 p. [40 references]

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Renal cell carcinoma

GUIDELINE CATEGORY

Diagnosis
Evaluation
Screening

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Nephrology
Nuclear Medicine
Oncology
Radiation Oncology
Radiology
Urology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of radiologic examinations in the staging of renal cell carcinoma

TARGET POPULATION

Adult patients with renal cell carcinoma

INTERVENTIONS AND PRACTICES CONSIDERED

1. X-ray
    - Chest
    - Radiographic survey, whole body
2. Computed tomography (CT), chest
3. Computed tomography angiography (CTA), abdomen
4. Magnetic resonance angiography (MRA), abdomen
5. Ultrasound (US), abdomen
6. Invasive (INV) angiography, kidney
7. INV venacavography inferior
8. Nuclear medicine (NUC) bone scan, whole body
9. Fluorodeoxyglucose positron emission tomography (FDG-PET), whole body

MAJOR OUTCOMES CONSIDERED

Utility of radiologic procedures in staging of renal cell carcinoma

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing

questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Renal Cell Carcinoma Staging

Variant 1: Tumor <3 cm.

Radiologic Procedure	Rating	Comments	RRL*

Radiologic Procedure	Rating	Comments	RRL*
CTA abdomen	9		Med
X-ray chest	8	Asymptomatic patient.	Min
MRA abdomen	8	See comments regarding contrast in text under "Anticipated Expectations."	None
CT chest	5	Patient with solitary nodule on chest X-ray or respiratory symptoms.	Med
US abdomen	4	More appropriate in patients with contrast sensitivity or renal insufficiency.	None
MRI head	1		None
FDG-PET whole body	1		High
NUC bone scan whole body	1		Med
INV angiography kidney	1		IP
INV venacavography inferior	1		IP
X-ray radiographic survey whole body	1		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Tumor >3 cm.

Radiologic Procedure	Rating	Comments	RRL*
CTA abdomen	9		Med
X-ray chest	8		Min
CT chest	8	Can identify subtle pulmonary nodules, mediastinal	Med

Radiologic Procedure	Rating	Comments	RRL*
		lymphadenopathy, bone and subcutaneous metastases. Confirms or excludes metastases seen on chest x-ray.	
MRA abdomen	8	See comments regarding contrast in text under "Anticipated Expectations."	None
FDG-PET whole body	4		High
US abdomen	3		None
INV venacavography inferior	3		IP
NUC bone scan whole body	3	More appropriate if tumor >7 cm or locally advanced; if bone pain present.	Med
MRI head	3	More appropriate if tumor >7 cm or locally advanced; or if neurologic symptoms present.	None
INV angiography kidney	2	Appropriate as part of renal tumor embolization prior to surgery in hypervascular tumors to reduce blood loss at surgery and for palliation of hematuria in inoperable tumors.	IP
X-ray radiographic survey whole body	1		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Renal cell carcinoma (RCC) accounts for 2% to 3% of all visceral malignancies. Approximately 36,000 new cases are diagnosed per year in the U.S., resulting in approximately 12,500 deaths. The incidence in men is nearly twice that in women. Metastatic disease at presentation varies with the patient population but typically occurs in about one-third of patients. The most common sites of distant metastases in descending order are the lung, bone, skin, liver, and brain, or in multiple sites.

The traditional treatment for RCC is radical nephrectomy, which involves node dissection and complete removal of the kidney and Gerota's fascia. Nephron-sparing surgery is increasingly used for small tumors. Prognosis is related to tumor size and stage. Robson's staging system (See Appendix 1 in the original guideline document.) was introduced in the 1960s and was much less complex than the TNM system first introduced in 1978 and revised in 1987 and 1997.

The Robson classification has significant limitations in that venous tumoral involvement and lymph node metastases are grouped in the same stage. There are now strong advocates for use of the revised 1997 TNM staging system (See Appendix 2 and 3 in the original guideline document), which is regarded as more accurate and of greater prognostic value. Two significant changes from the 1987 TMN system reflect the importance of tumor size and the extent of inferior vena cava (IVC) involvement. Tumors larger than 7 cm have been upgraded to T2 lesions. For surgical planning of partial elective nephrectomy, further division of T1 tumors into T1a and T1b was added, with a 4.0-cm cutoff separating them, for lesions confined to the kidney. The other significant change in the TNM system regards the extent of IVC involvement. Tumor involving the renal vein with or without IVC involvement below the diaphragm is considered T3b disease, whereas tumor involving the IVC above the diaphragm is classified as T3c.

Approximately 33% of RCCs present in stage I, 10% in stage II, 25% in stage III, and 33% in stage IV. With recent advancements in diagnosis and treatment, median 5-year cancer-specific survival rates have improved to 90% to 95% for stage I, 75% to 85% for stage II, 60% to 70% for stage III, and 20% to 30% for stage IV.

Prognosis is related to the size of the primary tumor as well. In one large study, patients with tumors <2.5 cm had a 100% 5-year survival rate, whereas tumors >10 cm in diameter yielded a median survival rate of 27% at 5 years. Only 5% to 10% of patients present with the classic triad of flank mass, hematuria, and pain. Since the widespread use of ultrasound (US), computed tomography (CT), and magnetic resonance imaging (MRI), RCCs are increasingly discovered when they are small and therefore at lower stage. Although these incidentally discovered small tumors have a much better prognosis than symptomatic tumors nonaggressive biologic behavior cannot be assumed. In one study of 50 lesions smaller than 3 cm, 38% had extension outside the renal capsule with T3/T4 disease. In another series, 12% of 318 T1 tumors had higher staging due to nodal and distant metastases this was likely related to other factors such as tumor subtype and nuclear grade.

Preoperative staging is important to the surgeon in planning the procedure. Tumor size is accurately determined by CT, MRI, and US. Perinephric tumor extension (T3a) is difficult to discriminate from nonspecific perinephric stranding from edema, vascular engorgement, or fibrosis. High-resolution CT using thin sections (~1 mm) can demonstrate perinephric stranding with 96% sensitivity, 93% specificity, and 95% accuracy, although false positives can be problematic. This determination is often not critical since the tumor and perinephric fat are usually removed at the time of radical nephrectomy. The presence of T3a disease should be excluded, however, if nephron-sparing surgery is planned. CT shows a 100% negative predictive value for T3a disease involving the adrenal gland. Breath-hold MRI showing lack of perinephric fat involvement has high negative predictive

value and predicts whether a tumor can be removed by nephron-sparing surgery. In a study of 73 RCCs one group of investigators showed that the presence of a pseudocapsule on MRI had an accuracy of 93% for clear-cell carcinoma in separating T1/T2 tumors from T3a tumors.

Tumor extends into the renal vein in 20% of cases and into renal vein and IVC in 10%, yet with proper surgical treatment, patients with T3b or T3c disease may have survival rates similar to those for stages 1 and II disease. Not only must the involvement of the renal veins and inferior vena be identified, but the cephalic extent of the tumor must also be correctly assessed for preoperative planning. Depending on the level of an IVC thrombus, the surgeon may need to perform a thoracoabdominal incision instead of an abdominal incision. Intra-atrial thrombus may require cardiac bypass. Intrahepatic caval thrombus may require open thrombectomy or, if there is transmural invasion of the caval wall, a graft placement. Thrombus limited to the renal vein ostia may be "milked" back into the vein without the need to open the vein. Therefore, accurate assessment of caval thrombus is important.

Dynamic enhanced CT is the most commonly employed method of identifying caval thrombus. Studies have shown that the technique used influences the success of CT, particularly with regard to the speed of scanning and rate of contrast media administration. Multi-detector-row CT shows very high accuracy rates, achieving equivalence with MRI. Signs suggestive of renal vein or caval thrombus include filling defects, enlargement of the vessel, and rim enhancement. With good technique, helical CT achieves 85% to 91% sensitivity routinely. Problems occur with technically inadequate boluses of contrast media, motion and flow artifact (especially with foot injections), and renal insufficiency. Venous anomalies should be sought, specifically the presence of a retroaortic left renal vein or circumaortic left renal vein, as these have surgical implications.

MRI is 83% to 100% sensitive for tumor thrombus but routinely achieves 90% to 100% sensitivity with modern equipment and may be slightly more accurate than CT in assessing the cephalic extent of the thrombus. Pitfalls of MRI include large tumors compressing the vena cava and flow-related artifacts, which can be reduced with appropriate saturation pulses. With bright blood techniques, rapid or turbulent flow can also lead to artifacts. Intravenous contrast may be helpful in this setting. The highest sensitivity and specificity in assessing venous involvement are achieved with gradient echo sequence. Bland thrombus (low signal intensity) can be distinguished from tumor thrombus, which exhibits intermediate-signal intensity. However, if a good-quality CT is obtained at several phases after contrast administration and the vein is clearly seen, MRI is usually not needed.

Other techniques include US, which is approximately 50% to 75% sensitive for caval thrombus and can be helpful for quickly identifying the cephalad extent of a tumor thrombus. US is limited in obese patients and in the presence of bowel gas, which interferes with the ability to image the renal vein-IVC junction.

Cavography is approximately 85% to 100% sensitive for detecting caval thrombus and is equal to MRI in accuracy. However, multidetector, multiphasic CT or MRI suffices to diagnose caval thrombus, and thus catheter cavography is rarely needed.

Angiography has proved insensitive for tumor thrombus. Its main roles are preoperative embolization to reduce blood loss in hypervascular tumors and for palliation of hematuria in inoperable tumors.

For TxN+ disease (lymph node involvement), CT and MRI are approximately equal, and both are superior to US. All imaging is suboptimal for N staging because of the reliance on node size for assessing metastases. MR lymphography with iron oxide nanoparticles shows promise as a methodology to identify tumor within lymph nodes regardless of their size. The agent is not yet available in the United States, however, and there is no large reported experience with its use in renal cell carcinoma. From a surgical perspective, the identification of nodes is less important because the nodes must be sampled at the time of surgery.

CT-guided aspiration biopsies can be performed if desired for documenting nodal metastases; however; they are rarely needed. Imaging is important for the preoperative detection of bulky adenopathy, which might complicate the surgical approach. This is especially true for laparascopic nephrectomies in which both the vascular anatomy and the nodal pathology may be poorly visualized. Accurate preoperative information becomes even more important, especially for centrally located renal tumors, emphasizing the need for computed tomography angiography (CTA) or magnetic resonance angiography (MRA) prior to such a procedure.

The presence of T4M0–1 disease (metastatic disease with contiguous invasion) is also important to the surgeon. Common sites of contiguous organ invasion include the liver, diaphragm, psoas muscles, pancreas, and bowel. Neither CT nor MRI is ideal, because it is impossible at times to distinguish lack of a fat plane from immediately adjacent but not invasive tumor or from directly invasive tumor; however, both techniques perform well, with a sensitivity and specificity >90%. The multiplanar capabilities of MRI can be useful in this regard; however, neither technique always assesses liver or diaphragmatic invasion correctly. Angiography can also be misleading, since tumors can recruit vessels from the liver or elsewhere without the tumor actually invading the organ.

T4M1N+ disease (distant metastases) principally affects the chest, bone, liver, and brain. Routine chest radiographs are considered necessary, but the routine use of chest CT is more controversial. For small lesions (<3 cm) the risk of metastases is so small as to eliminate the need for chest CT; however, the risk increases with the size of the primary tumor, and although universally accepted guidelines do not yet exist chest CT is justified for larger tumors. When the chest radiograph is suspicious or positive, chest CT is useful for confirming or excluding metastases and defining the extent of disease.

In a study of 119 patients undergoing preoperative CT staging, routine pelvic CT yielded no findings related to the renal cell carcinoma.

Similarly, neither routine bone scans nor bone surveys appear routinely justified. However, if the patient has an elevated alkaline phosphatase, bone pain, or an extremely large and aggressive tumor, bone scans may be helpful. Furthermore, brain MRI does not appear routinely justified, but it is indicated when neurologic symptoms are present, if the primary tumor is large, or if other metastatic disease is already present.

Positron emission tomography (PET) does not yet have an established role in staging renal cancer. Early studies using FDG-PET suggest that it may be difficult to even detect primary renal cancers against the normal background of high activity in the kidneys. PET may be helpful for establishing metastatic disease in lesions detected by CT, MRI, or bone scan, and it may be used to detect unsuspected metastases in high-risk patients. Although negative PET results cannot exclude metastatic disease, a positive PET scan should be considered highly suspicious for local recurrence or metastatic disease due its high specificity.

Summary

Thus, the routine staging of renal cancer should depend on the size of the primary tumor. For small or incidentally detected tumors (≤3 cm), multidetector, multiphasic CT of the abdomen with either CT of the chest or chest radiography is usually sufficient. MRI of the abdomen is a suitable substitute when the patient cannot undergo contrast-enhanced CT. If symptoms of bone pain or neurologic symptoms exist, bone scan or MRI of the brain may be employed.

For larger primary tumors (>3 cm), multidetector, multiphasic CT of the abdomen with chest CT is the diagnostic modality of choice. If the status of the renal veins and inferior vena cava cannot be resolved on CT, contrast-enhanced multiphasic 3D MR venography (MRV) should be performed. MRI of the abdomen is a suitable substitute for staging renal cancer when the patient cannot undergo contrast-enhanced CT.

US may be performed prior to surgery to ascertain the cephalad extent of a previously identified caval tumor thrombus but cannot be relied upon to detect small renal vein or IVC thrombus. Cavography is employed only in unusual circumstances. Prior to any major surgery to remove a locally advanced primary tumor, brain MRI and bone scan should be performed. Lesions detected by any modality that are suspicious for metastatic disease should be either biopsied or examined with an FDG-PET scan.

Although not strictly staging, CTA and MRA should be incorporated into any staging study of the renal cancer, as the vascular information can be helpful to surgeons in planning a resection. Catheter angiography can be performed to embolize large tumors prior to resection.

Anticipated Exceptions

In patients with history of adverse reaction to contrast media or renal insufficiency, MRI and/or US may be preferred to CT. MRI is superior to US in evaluating lymphadenopathy, determining the organ of origin of the mass, diagnosing intracaval and renal venous thrombus, and demonstrating bone metastases.

Nephrogenic systemic fibrosis (NSF, also known as nephrogenic fibrosing dermopathy) was first identified in 1997 and has recently generated substantial concern among radiologists, referring doctors and lay people. Until the last few years, gadolinium-based MR contrast agents were widely believed to be almost universally well tolerated, extremely safe and non-nephrotoxic, even when used in patients with impaired renal function. All available experience suggests that these

agents remain generally very safe, but recently some patients with renal failure who have been exposed to gadolinium contrast agents (the percentage is unclear) have developed NSF, a syndrome that can be fatal. Further studies are necessary to determine what the exact relationships are between gadolinium-containing contrast agents, their specific components and stoichiometry, patient renal function and NSF. Current theory links the development of NSF to the administration of relatively high doses (e.g., >0.2 mM/kg) and to agents in which the gadolinium is least strongly chelated. The FDA has recently issued a "black box" warning concerning these contrast agents (http://www.fda.gov/cder/drug/InfoSheets/HCP/gcca_200705HCP.pdf).

This warning recommends that, until further information is available, gadolinium contrast agents should not be administered to patients with either acute or significant chronic kidney disease (estimated GFR <30 mL/min/1.73m^2), recent liver or kidney transplant or hepato-renal syndrome, unless a risk-benefit assessment suggests that the benefit of administration in the particular patient clearly outweighs the potential risk(s).

Abbreviations

- CT, computed tomography
- CTA, computed tomography angiography
- FDG-PET, fluorodeoxyglucose positron emission tomography
- INV, invasive
- IP, in progress
- Med, medium
- Min, minimal
- MRA, magnetic resonance angiography
- MRI, magnetic resonance imaging
- NUC, nuclear medicine
- US, ultrasound

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for renal cell carcinoma staging

POTENTIAL HARMS

The relative radiation level is high for fluorodeoxyglucose positron emission tomography (FDG-PET) of the whole body; medium for computed tomography angiogram (CTA) of the abdomen, CT of the chest, and nuclear medicine (NUC) bone scan of the whole body; and low for X-ray radiographic survey of the whole body.

CONTRAINDICATIONS

CONTRAINDICATIONS

In patients with history of adverse reaction to contrast media or renal insufficiency, MRI and/or US may be preferred to CT.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Curry NC, Francis IR, Baumgarten DA, Bluth EI, Bush WH Jr, Casalino DD, Israel GM, Jafri SZ, Kawashima A, Papanicolaou N, Remer EM, Sandler CM, Spring DB, Fulgham P, Expert Panel on Urologic Imaging. Renal cell carcinoma staging. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 8 p. [48 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1995 (revised 2007)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Urologic Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Names of Panel Members: Nancy S. Curry, MD; Isaac R. Francis, MD2; Deborah A. Baumgarten, MD; Edward I. Bluth, MD; William H. Bush, Jr., MD; David D. Casalino, MD; Gary M. Israel, MD; S. Zafar H. Jafri, MD; Akira Kawashima, MD;

Nicholas Papanicolaou, MD; Erick M. Remer, MD; Carl M. Sandler, MD; David B. Spring, MD; Pat Fulgham, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

It updates a previous published version: Choyke PL, Bluth EI, Bush WH Jr, Casalino DD, Francis IR, Jafri SZ, Kawashima A, Kronthal A, Older RA, Papanicolaou N, Ramchandani P, Rosenfield AT, Sandler CM, Segal AJ, Tempany C, Resnick MI, Expert Panel on Urologic Imaging. Renal cell carcinoma staging. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 5 p. [40 references]

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GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® *Anytime*, *Anywhere*™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.
- ACR Appropriateness Criteria®. Relative radiation level information. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer on June 29, 2001. This summary was updated by ECRI on September 8, 2004. The updated information was verified by the guideline developer on October 8, 2004. This NGC summary was updated by ECRI on February 9, 2006. This NGC summary was updated by ECRI Institute on December 4, 2007.

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